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Pamphilius stramineipes (Hymenoptera, Pamphiliidae) and its Close Relatives

By

Akihiko SHINOHARA

Department of Zoology, National Science Museum, Tokyo

Abstract The *stramineipes* subgroup of the *vafer* group of *Pamphilius* is defined to include five Palearctic and one Nearctic species, *i.e.*, *P. stramineipes* (HARTIG), *P. pacificus* (NORTON), *P. planifrons* BENEŠ, *P. rhoae* n. sp. from Korea, *P. thorwaldi* KONTUNIEMI, and *P. lobatus* MAA. *Pamphilius stramineipes* is newly recorded from Sakhalin and its occurrence on Etorofu Is. is reconfirmed. *Pamphilius lobatus* and *P. planifrons* are recorded for the first time from Korea, and the male of the latter species is newly described. A key is given to separate the six species.

The *vafer* group is the largest assemblage of species currently recognized in the leaf-rolling sawfly genus *Pamphilius*. BENEŠ (1976), when he defined the species-group, included 17 Palearctic species in it, and five species were subsequently added by SHINOHARA and OKUTANI (1983), SHINOHARA (1985), ACHTERBERG and AARTSEN (1986), SHINOHARA, NAITO and HUANG (1988), and SHINOHARA (in press). The six species enumerated in this paper, mainly characterized by the short 3rd antennal segment, the nearly concolorous stigma, and the long valviceps in the male genitalia, form a subgroup within the *vafer* group, which is called herewith the *stramineipes* subgroup. Since three of the six, including one new and one Nearctic species, have not been assigned to the *vafer* group, the number of species recognized in this species-group now goes up to 25.

In the following lines, I will define the *stramineipes* subgroup, making reference to the species closely allied to but not included in it, and give accounts of respective species and a key for separating them.

The following abbreviations are used in the text for the depository of the loaned material: EWU — Natural History Museum, Ewha Womans University, Seoul; HU — Entomological Institute, Hokkaido University, Sapporo; MU — Zoological Museum, Moscow State University, Moscow; UOP — Entomological Laboratory, University of Osaka Prefecture, Sakai; USNM — U. S. National Museum, Washington, D. C.; ZIL — Zoological Institute, Academy of Sciences of the U.S.S.R., Leningrad.

The Subgroup of *Pamphilius stramineipes*

According to BENEŠ (1976), the species of the *vafer* group are characterized by flat or only slightly convex frons without sharp crests, subparallel inner orbits, more or

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less pilose vertex, bidentate right mandible, well developed postgenal carina, pale hind femora and apically bulbous or widened, anchor-like penis valves. By the combination of these characters, most of the component species can be recognized as members of the *vafer* group, although none of the single characters, excepting the shape of the valviceps, are peculiar to them. The *vafer* group is considered monophyletic in view of the apically bulbous or anchor-like penis valves, which are unique to the species of this group and regarded as an autapomorphy; the anchor-like penis valves, *e.g.*, those of *P. varius*, probably represent further modification from the simpler bulbous type.

The members of the *stramineipes* subgroup are characterized by the following features: 3rd antennal segment short, less than twice as long as the 4th; stigma pale yellow to brown, marginally more or less darkened; inner margins of gonostipites distinctly divergent posteriorly in dorsal aspect; valviceps long. The six species belonging to this subgroup are: *P. stramineipes* (HARTIG) widely distributed in Eurasia, *P. pacificus* (NORTON) from western North America, *P. planifrons* BENEŠ from the Far East, *P. rhoae* n. sp. from Korea, *P. thorwaldi* KONTUNIEMI from Europe, and *P. lobatus* MAA from the Far East. Of the five previously known species, *P. pacificus* and *lobatus* were not dealt with in BENEŠ's revision of the *vafer* group (1976).

The *stramineipes* subgroup is well defined by the combination of characters given above, though none of the characters are peculiar to the members of the subgroup and its monophyly remains uncertain. The subgroup may be divided into three pairs of closely related species, *i.e.*, *P. stramineipes* and *pacificus*, *P. planifrons* and *rhoae*, and *P. thorwaldi* and *lobatus* (for more details, see remarks under each species). The interrelationship of the three species pairs is not very clear, but the last two pairs (*planifrons*+*rhoae* and *thorwaldi*+*lobatus*) are probably more closely related to each other than to the first (*stramineipes*+*pacificus*), because they show more specialized character states, such as very long valviceps, basally lobed apiceps and comparatively short 3rd antennal segment.

Apparently closely related to this group are *P. venustus* (SMITH) and *P. sapporensis* (MATSUMURA) from the Far East, *P. kamikochensis* TAKEUCHI from Japan, *P. nigropilosus* SHINOHARA, NAITO et HUANG from western China, and *P. norimbergensis* ENSLIN from central and southern Europe, all of which are members of the *vafer* group and have a short 3rd antennal segment. The first two species, which are closely allied to each other (SHINOHARA & OKUTANI, 1983), do not belong to the *stramineipes* subgroup, because the stigma of these species is bicolored and the inner margins of the gonostipites are not divergent posteriorly in dorsal aspect. *Pamphilius kamikochensis* differs from the members of the subgroup only in having the 3rd antennal segment usually more than twice as long as the 4th. The peculiar Chinese species *P. nigropilosus*, characterized by the entirely yellow scape (except for radicula) and very long blackish lanate hairs densely covering the head and thorax, is not assignable to the subgroup, because the valviceps of this species is rather short. *Pamphilius norimbergensis*, which was recently moved to the *vafer* group from the *alternans* group

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(SHINOHARA, in press), does not belong to the *stramineipes* subgroup, as the shape of the valviceps and apiceps is quite different.

Pamphilius stramineipes (HARTIG)

(Figs. 1 A–D, 2 A, 3 A–C, 6 A)

Lyda stramineipes HARTIG, 1837, 347.

Pamphilius stramineipes: STRITT, 1934, 334; GUSSAKOVSKIJ, 1935, 184, 378; KLIMA, 1937, 63; TAKEUCHI, 1955, 11; BENEŠ, 1976, 159, 170; VASSILEV, 1978, 33; VIITASAARI, 1982, 53; ACHTERBERG & AARTSEN, 1986, 43; MIDTGAARD, 1987, 129.

Anoplolyda pallipes: TAKEUCHI, 1936, 61 (nec ZETTERSTEDT, 1838) (partim).

For more references, see KLIMA (1937).

Distribution. Europe to western Siberia (Norway, Scotland, France, Germany, Austria, Czechoslovakia, Hungary, Italy, Yugoslavia, Bulgaria, U.S.S.R.); Sakhalin (new record); Etorofu Is.

Material examined. Norway: 1 ♀, "Norway EIS 28, AK Baerum: Ostøya, 31. V. 1984, leg. F. MIDTGAARD"; 1 ♂, "Norway." Czechoslovakia: 1 ♀, "Chodov, 16. 6. 80, WÜSTNEI"; 1 ♂, "Chodov, Böhmen." Sakhalin: 1 ♀, "Saghalien Cent. Exp. Sta., 15/VII. 1934, Tonnai" (UOP); 1 ♂, "Ichinosawa, 9. VII. 1930, TAKEUCHI" (UOP).

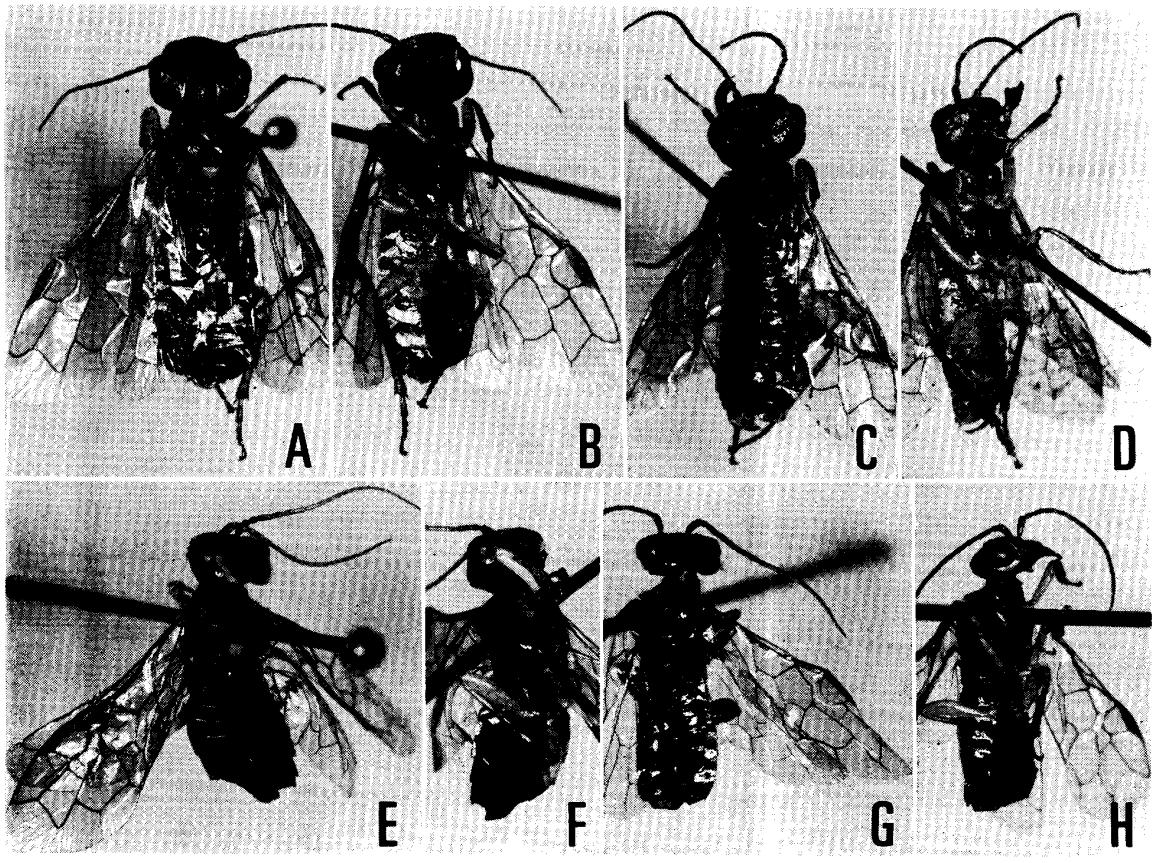

Fig. 1. A–B, *Pamphilius stramineipes* (HARTIG), ♀, Etorofu Is.; C–D, do., ♂, Etorofu Is.; E–F, *P. pacificus* (NORTON), ♀, Corvallis; G–H, do., ♂, Adobe Creek.

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Etorofu Is.: 3 ♀, "Kuriles, Etorofu, Y. SUGIHARA, Shana, 11–20. VII. 1935" (UOP & HU); 1 ♂, "Kuriles, Etorofu, Y. SUGIHARA, Porosu, 14, 15. VII. 1936" (HU).

Variation. No significant geographical variations are observed in the limited material at hand, with a few possible exceptions in coloration. VIITASAARI (1982) gives 8–12 mm for the range of variation in the length of the females, and 8–10 mm for that of the males; all the specimens in my material are within this range. Only four antennae in my material are intact; two antennae of the Norwegian female are 22-segmented, one belonging to the Norwegian male has 23 segments and one belonging to the Etorofu male 21 segments. The 3rd antennal segment is about 1.5 to 1.8 times as long as the 4th in the females (VIITASAARI, 1982, gives 1.6–1.8 and ACHTERBERG & AARTSEN, 1986, 1.6–1.9), and 1.5 or 1.6 times in the males (both VIITASAARI, 1982, and ACHTERBERG & AARTSEN, 1986, give 1.4–1.5).

In coloration, this species appears variable, as pointed out by ENSLIN (1917) and others. My material shows the following variation:—Females: The specimens from Czechoslovakia and Sakhalin and one of the three specimens from Etorofu Is. have an almost identical color pattern on the head (dorsal marking as in fig. 28 k in VIITASAARI, 1982, and gena with large yellowish spot). The Norwegian specimen has a similar color pattern dorsally, but the yellowish genal spot is nearly missing. In the two remaining specimens from Etorofu Is., the yellowish marking, including the genal spot, is similar to that in the first three specimens, but the large area between the eyes, including most of the frons and both the paraantennal fields, is predominantly brown (Fig. 2 A). The antennal scape is largely black in the two European and the Sakhalin specimens, whereas it is largely dark brown in the Etorofu ones. The mesonotum, excluding the mesoscutellum, is entirely black and the 3rd abdominal tergum is predominantly orange in the Czech specimen, while the prescutum is pale yellow posteriorly, the mesoscutum is obscurely marked with pale yellow, and the 3rd tergum is mostly black in all the other specimens. Males: The East Asian specimens are paler than the European ones in head color pattern; the lateral part of the pale yellow marking on the frons extends dorsally to the level of the facial crest in both the specimens, and the genal spot is enlarged to cover most of the gena and extends dorsally along crassa to fuse the posterior end of the postocular stripe in the specimen from Etorofu. The large yellowish marking on the mesepisternum, which usually covers most of the lateral part of the latter, is reduced to an elliptic spot in the Norwegian specimen.

Host-plant. *Rosa* sp. ("Wildrosen") (STRITT, 1934).

Remarks. The nearest relative of this species is probably *P. pacificus* from western North America. These two species share a smooth paraantennal field and a simple finger-like apiceps and a comparatively short valviceps in the male genitalia. The latter two characters, together with the comparatively long 3rd antennal segment of *P. stramineipes* (1.4–1.9 times as long as the 4th), may be regarded as being plesiomorphic within the subgroup. Larvae of the two species feed on *Rosa*, making a non-specialized abode. Each of the two species has a wide distributional range, but

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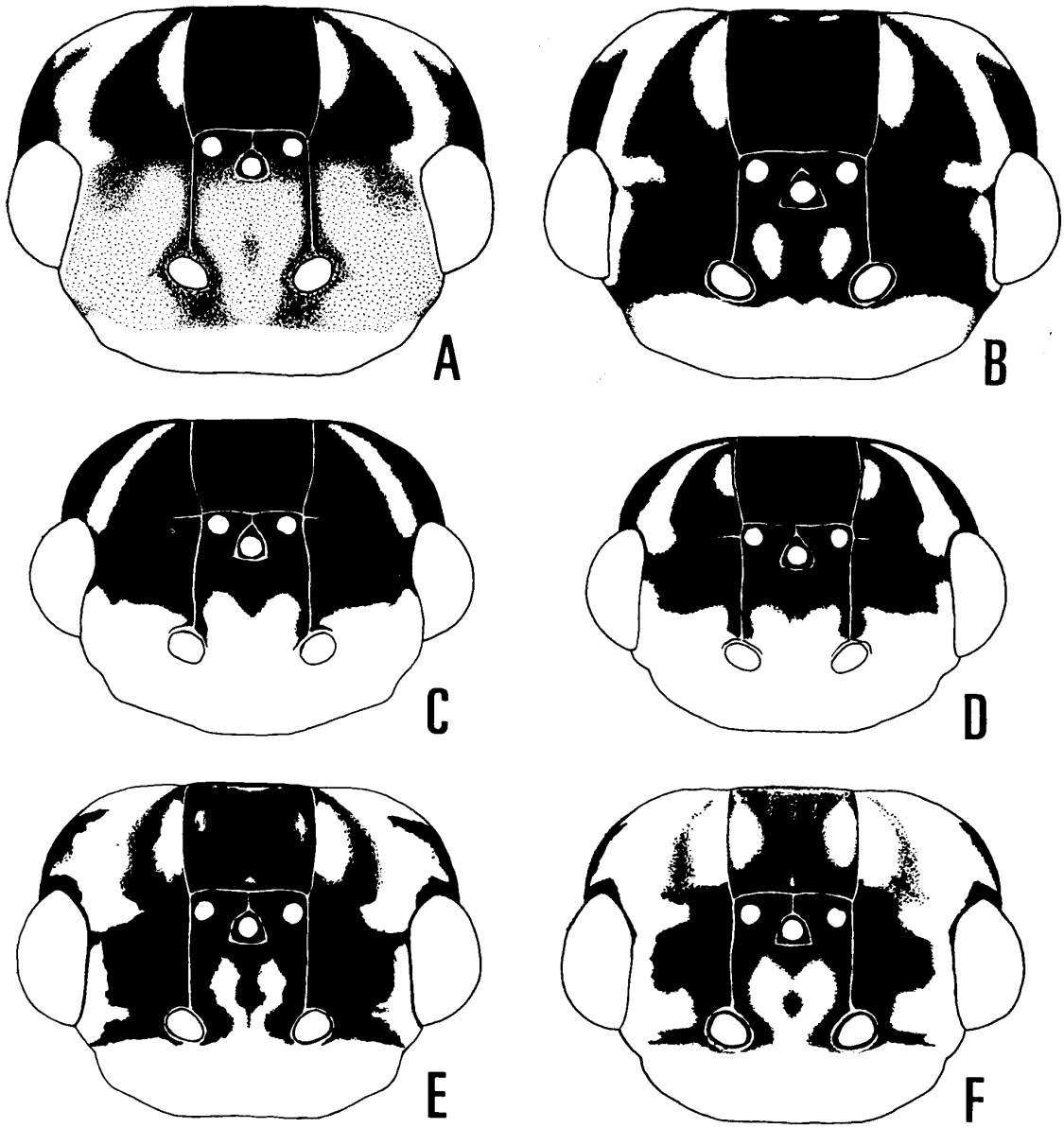

Fig. 2. Heads, dorsofrontal aspect. —— A, *Pamphilius stramineipes* (HARTIG), ♀, Etorofu Is.; B, *P. planifrons* BENEŠ, ♀, Sedanka; C, do., ♂, Mt. Odaesan; D, *P. rhoae* n. sp., ♂, holotype; E–F, do., ♀, paratopotypes.

their ranges do not overlap; they have probably evolved by the subdivision of an ancestral species, which may have been distributed throughout Eurasia and western North America. The two species are readily separable by the characters given in the key.

TAKEUCHI (1955) first recorded *P. stramineipes* from East Asia, giving the collection data of four specimens from Etorofu Is. in the southern Kuriles. This is the only record of the species from East Asia. BENEŠ (1976), on the other hand, considered that TAKEUCHI's record was "probably based on misidentification." A study of

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TAKEUCHI's material has revealed that the Etorofu specimens were correctly identified, and a male specimen from Sakhalin, which was determined as "*Anoplolyda pallipes* (ZETTERSTEDT)" by TAKEUCHI (1936), is in reality *P. stramineipes*. This species is thus known to occur in Europe and Siberia east to Yeniseysk and Sakhalin and Etorofu Is.; possibly it also occurs across East Siberia.

Pamphilius pacificus (NORTON)

(Figs. 1 E–H, 3 D–F, 6 B)

Lyda pacifica NORTON, 1869, 338.
Pamphilius pacificus: MIDDLEKAUFF, 1964, 40.
See MIDDLEKAUFF (1964) for more references.

Distribution. Western North America.

Material examined. Oregon: 1 ♀, "Corvallis, Ore., May 21, 1978, H. & M. TOWNES"; 1 ♀, same data except "May 8, 1978." California: 1 ♀, "Berryessa, Napa Co., Cal., IV–19, 35," "HH KEIFER Collector"; 1 ♂, "Adobe Creek, W. Stanislaus Co., Cal., 6 Apr. 49."

Variation. I have examined only three females and one male. The females are 7.5–8.0 mm long and the male is 7.5 mm; MIDDLEKAUFF (1964) gives 6.7 mm for the length of body of the female and 6.0 mm for that of the male, but these values do not include the head. The five female antennae have 24–26 segments, with the 3rd segment about 1.4–1.5 times as long as the 4th and the two male antennae are 23- and 25-segmented, respectively, with the 3rd segment about 1.3 times as long as the 4th.

In coloration, the two females from Oregon are very similar to each other, having the genal spot widely separated from the posterior end of postocular stripe, the prescutum entirely black, the 4th and 5th abdominal sterna without blackish marking, and yellow marking along the posterior margins of the 4th to 6th abdominal sterna nearly missing, but the 6th abdominal tergum is largely orange in one specimen, while it is entirely black in the other. The California specimen has the genal spot extending dorsally along crassa and connected with the posterior end of postocular stripe, the prescutum marked with yellow, the 4th and 5th abdominal sterna with large blackish marking, and the posterior margins of the 4th to 6th abdominal sterna obscurely marked with yellow.

Host-plant. Rosa californica.

Remarks. This Nearctic species closely resembles *P. stramineipes* from Eurasia. Relationship of the two species is discussed under the latter species.

Pamphilius planifrons BENEŠ

(Figs. 2 B–C, 4 A–D, 5 A–C, 6 C)

Pamphilius planifrons BENEŠ, 1976, 164.

Male (hitherto undescribed; description based on a specimen from Mt. Odaesan, Korea, Fig. 4 C–D). Head black, with marks as in Fig. 2 C, entire malar space and

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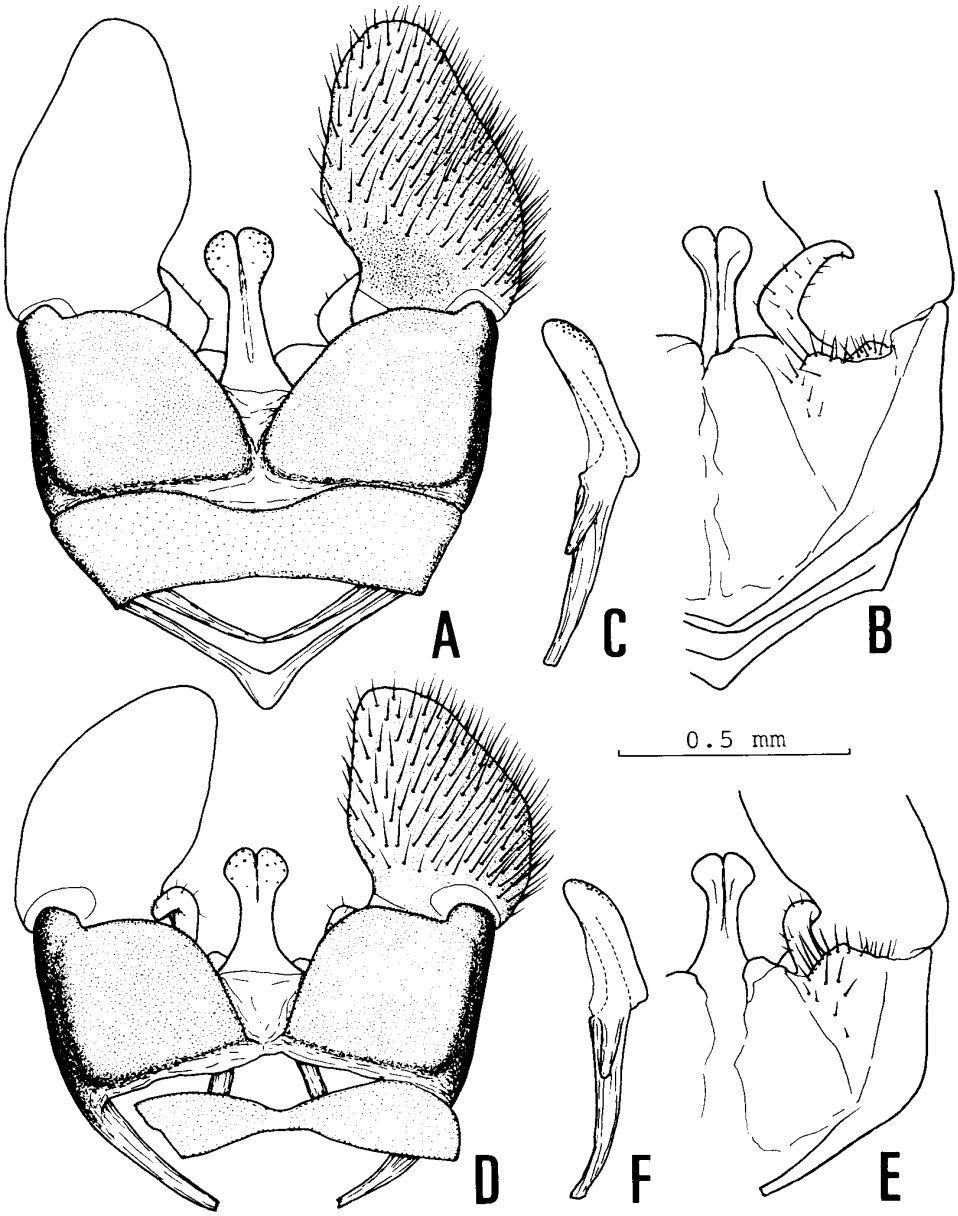

Fig. 3. Male genitalia, *Pamphilius stramineipes* (HARTIG), Chodov (A–C) and *P. pacificus* (NORTON), Adobe Creek (D–F). A, D, Dorsal aspect; B, E, ventral aspect; C, F, penis valve, lateral aspect.

gena pale yellow; mandible pale yellow, with inner tooth largely black, and apex dark rufous; scape and pedicel pale yellow, with dorsal surface largely black; flagellum dark brown, becoming blackish toward apex, with 1st segment marked with black dorsally. Thorax black, with following pale yellow: most of lateral pronotum extending dorsally along posterior margin to cover broad posterolateral corner of dorsal pronotum, ventral half of cervical sclerite, tegula, posterior half of prescutum, mesoscutellum, mesepisternum including preepisternum (except for black lateral spot

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along very narrowly black posterodorsal margin), posterior margin and oblong spot at dorsal margin of mesepimeron, metascutellum, linear mark connecting inner ends of cenchri, metepisternum (except for ventral surface), dorsal half (except for anterior part) and posterior margin of metepimeron; legs pale yellow, except for narrowly black coxal bases. Wings hyaline, distinctly stained with brown; veins blackish brown, with veins C and Sc yellowish, and base of vein 1A pale yellow; stigma dark yellow, marginally dark brown. Abdomen orange dorsally and pale yellow ventrally; dorsum with propodeum and 2nd tergum mostly, broad anterior margin (except for lateral margin and median interruption) of each of 3rd to 5th terga, and 6th to 8th terga (except for broad lateral and posterior margins) black, and lateral margin (more broadly on more posterior segments), very narrow posterior margin (rather broadly on posterior segments) of each of 2nd to 8th terga, and 10th tergum wholly pale yellow; venter with anterior margin of 2nd sternum black.

Frons weakly subtriangularly swollen in dorsal aspect, somewhat concave below ocelli down to ill-defined median fovea; ocellar basin inconspicuous; frontoclypeal crest rather flat, rounded, highest between antennal sockets; facial crest moderately convex, bluntly carinate. Upper part of head behind transverse and lateral transverse sutures rather smooth, with large, often ill-defined punctures; area from facial crest to lateral transverse suture coarsely rugose, central and outer part somewhat smoother, with large, rather shallow irregular punctures; frons almost reticulate, with coarse large deep punctures; paraantennal field with dense small punctures, transversely rugose, with only ventral part nearly impunctate along inner orbit; clypeus with distinct medium-sized punctures, with interspaces smooth medially and coarsely rugose laterally; gena coriaceous, with rather small, often ill-defined punctures; head covered with rather long silvery hairs before crassa, except for nearly glabrous ventral part of paraantennal field. Both antennae 23-segmented; 3rd segment as long as and distinctly thinner in lateral view than the 4th, with apex strongly oblique. Tarsal claw with inner tooth rather small, much shorter than apical one, without distinct basal lobe. Forewing with cell C pilose all over. Subgenital plate with apical margin broadly rounded. Genitalia as in Fig. 5 A–C.

Measurements (in mm): Length 9.5, forewing length 8.5, head width 2.62, thorax width 2.36, scape length 0.73, pedicel length 0.26, 3rd antennal segment length 0.41, 4th antennal segment length 0.41, 5th antennal segment length 0.40, malar space 0.23, distance between proximal margins of antennal sockets 0.50, distance between antennal socket and inner orbit 0.55, vertex (length × width) 0.58 × 0.70, eye (shortest diameter × longest diameter) 0.64 × 0.80, hind tibia length 2.72, hind basitarsus length 0.74, length of 2nd–4th hind tarsal segments together 0.65, 5th tarsal segment length 0.43.

Female. Described in detail by BENEŠ (1976).

Distribution. U.S.S.R. (Primorskij Kraj); Korea (new record).

Material examined. Primorskij Kraj: ♀ (holotype), "Okr. Vladiv. Okeansk. 30/V 1936 N. FILIPPOV" (MU); 1 ♀, "Vladivostok, Sedanka, A. ZINOVJEV, 1. VI. 1979"

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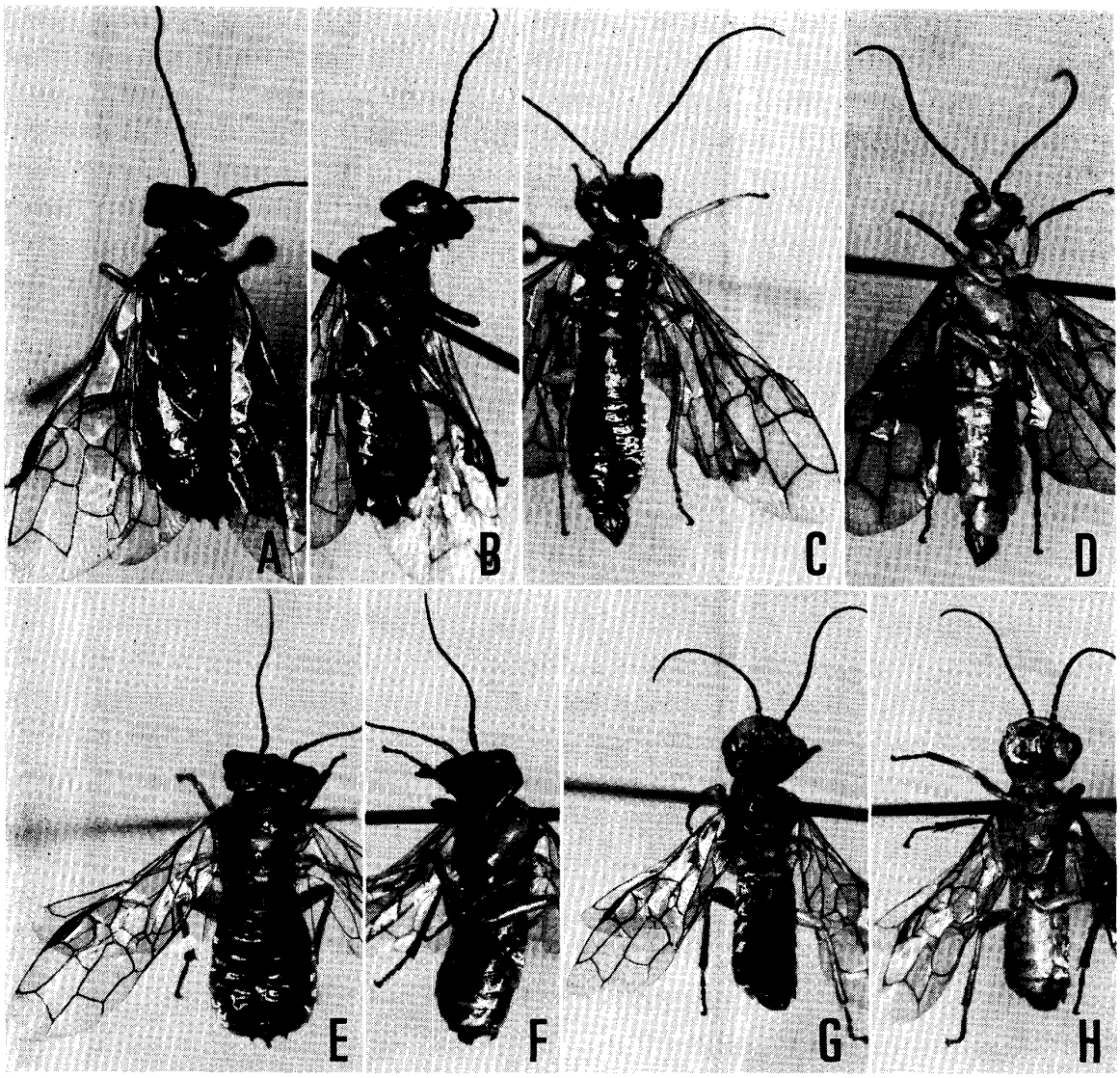

Fig. 4. A–B, *Pamphilius planifrons* Benes, ♀, Sedanka; C–D, do., ♂, Mt. Odaesan; E–F, *P. rhoae* n. sp., ♀, paratopotype; G–H, do., ♂, holotype.

(ZIL). Korea: 2 ♂, Mirugam (Pugdaesa), 1300 m alt., Mt. Odaesan, Kangweondo, 10–11. VI. 1987, A. Shinohara.

Variation. Only two females and two males have been available for this study. The female from Sedanka (Fig. 4 A–B) is smaller than the holotype, measuring only 9.5 mm, but otherwise quite similar to the latter; the right antenna has 25 segments (the left one is abnormal), with the 3rd segment about 1.3 times as long as the 4th. One of the males differs from the other, which is described above, in having an additional oblong yellow spot along each lateral suture, the upper part of frons more strongly depressed in front of ocelli, and the 3rd antennal segment is about 1.1 times the length of the 4th.

Host-plant. Unknown.

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Remarks. This species is closely related to *P. rhoae* n. sp. described from Korea. The two East Asian species, whose immature stages are unknown, are characterized by the greenish tint in the pale color, lack of orange marking on the abdomen of the females, and very long but not strongly widened valviceps. The limited information about the distribution of the two species suggests that their ranges probably overlap; *P. planifrons* is recorded from Primorskij Kraj and Korea (Mt. Odaesan) and *P. rhoae* is known only from the type locality (Kwangneung) in Korea, the two Korean localities being only 120 km apart. The two species can be distinguished by the characters given in the key.

The male of *P. planifrons* is unknown from the Soviet Far East. Despite the fairly large difference in the coloration of the abdomen, I prefer to regard the Korean males described above as belonging to *P. planifrons*, because they are similar to the female in the general structure, punctuation and pilosity of the head, the relative lengths of the 3rd to 4th antennal segments, the color of the stigma, and the pilosity of the cell C in the forewing. The pale color of the body and legs is distinctly greenish in the female, while it is pale yellow without greenish tint in the male. A similar case of sexual color dimorphism is known in *P. volatilis* (SMITH) and *P. ishikawai* SHINOHARA.

In general facies, the male of this species closely resembles that of *P. thorwaldi*, but differs from the latter in the shorter 3rd antennal segment (1.0–1.1 times the length of the 4th in *planifrons*, 1.2–1.4 times in *thorwaldi* (VIITASAARI, 1982)) and the shape of the valviceps in male genitalia (in *planifrons*, it is slender, with apical part only weakly convex laterally in dorsal aspect (Fig. 5 A), whereas in *thorwaldi*, it is robust and strongly expands laterally at the apex (Fig. 8 D)).

Pamphilius rhoae n. sp.

(Figs. 2 D–F, 4 E–H, 5 D–F, 6 D)

Female (paratopotype, Fig. 4 E–F). Head black, with pale greenish yellow areas as in Fig. 2 E; malar space (except for black ventral margin) and gena pale greenish yellow; mandible pale greenish yellow, with most of ventral and inner surfaces black and apex rufous; antennal scape black, with outer surface pale green; pedicel and flagellum blackish brown to black, with pedicel and a few basal flagellar segments brown on ventral surface. Thorax black, with following pale, faintly greenish yellow areas: broad posterior margin of dorsal pronotum (interrupted medially by black), entire lateral pronotum (continuous to pale area on dorsal pronotum), ventral surface of cervical sclerite, tegula, posterior 2/3 of prescutum, spot on each mesonotal lateral lobe above parascutellar area, mesoscutellum, very broad lateral part of mesepisternum, spot at dorsal margin and large oblong mark along posterior margin of mesepimeron, metascutellum, median part of metascutum enclosed by metascutellum and cenchri, metepisternum (except for ventral surface), and metepimeron (except for anteroventral part); legs pale yellow, with very narrow coxal bases black. Wings hyaline, stained very slightly with dark brown; veins blackish brown, with veins C and Sc pale greenish

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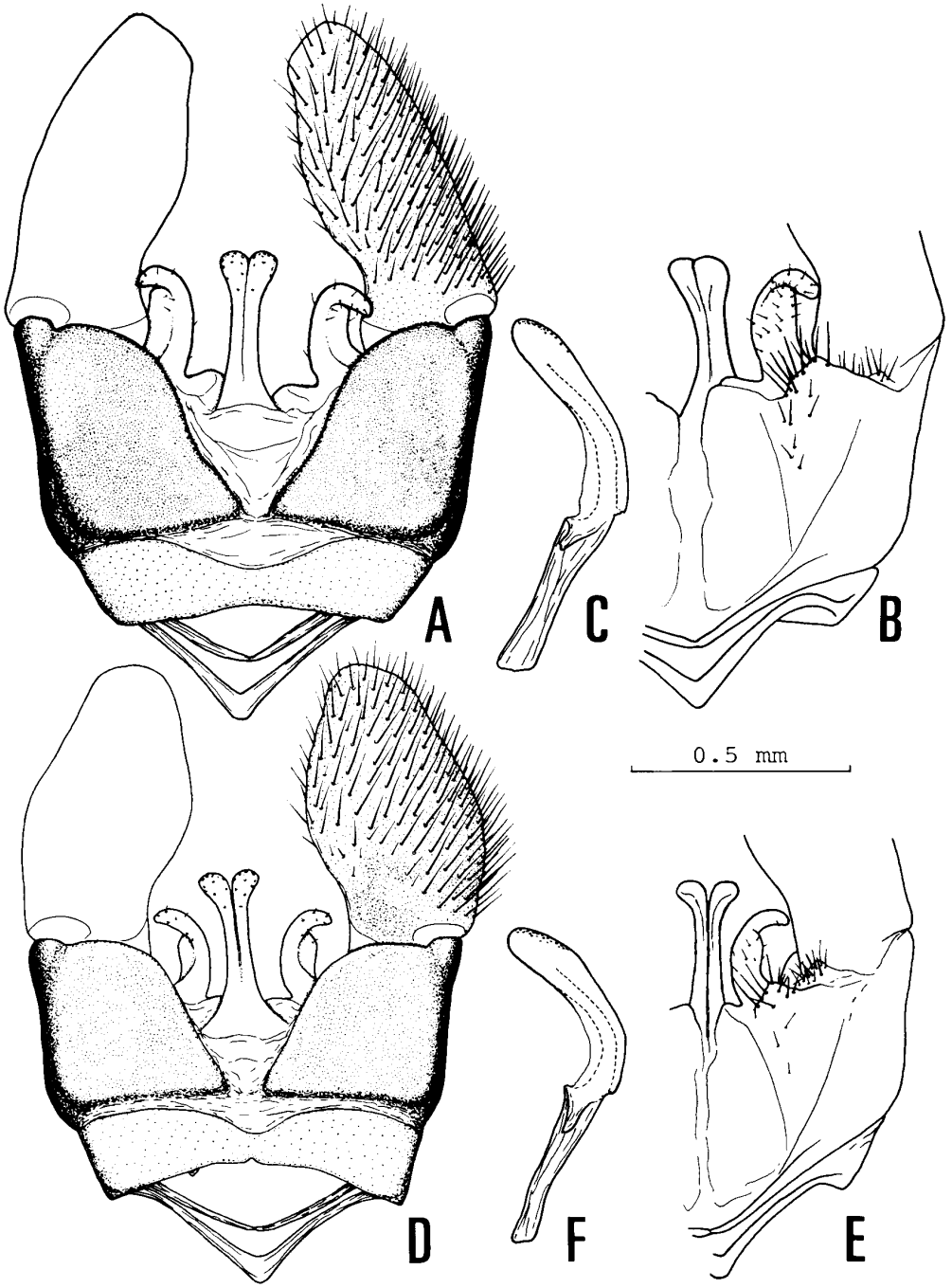

Fig. 5. Male genitalia, *Pamphilius planifrons* Beneš, Mt. Odaesan (A–C) and *P. rhoae* n. sp., paratopotype (D–F). A, D, Dorsal aspect; B, E, ventral aspect; C, F, penis valve, lateral aspect.

brown and bases of R and 1A pale greenish; stigma pale greenish brown, broadly margined with blackish brown. Abdomen with dorsum black, with following pale, faintly greenish yellow areas: each lateral margin, inverted T-shaped mark in postero-

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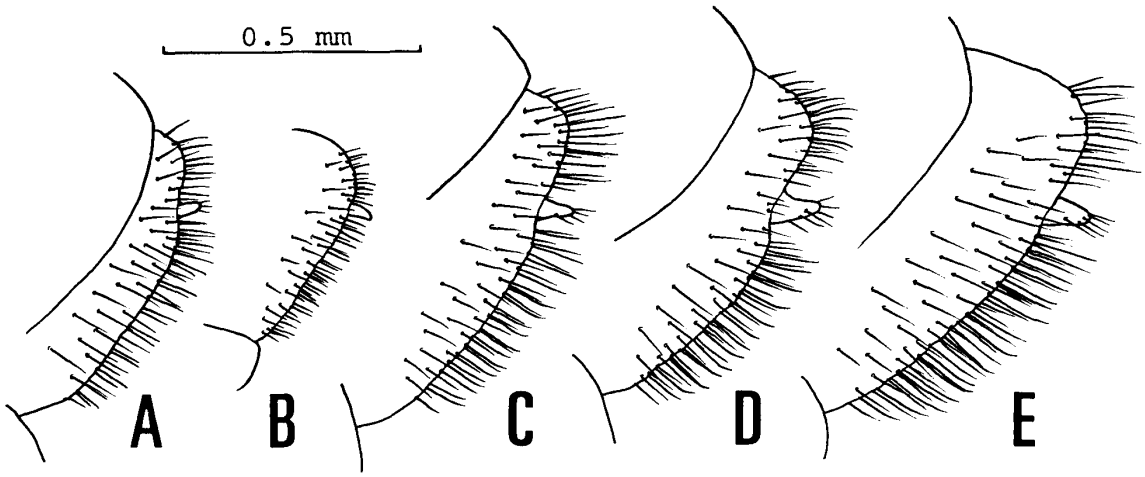

Fig. 6. Sawsheaths, lateral aspect. —— A, *Pamphilius stramineipes* (HARTIG), Chodov; B, *P. pacificus* (NORTON), Corvallis; C, *P. planifrons* BENEŠ, Sedanka; D, *P. rhoae* n. sp., paratopotype; E, *P. lobatus* MAA, Minoto, Mts. Yatsugatake, Nagano Pref., Japan.

median part of 2nd tergum, small spot in posteromedian part of 3rd tergum, very narrow posterior margins of 4th and 5th terga, broad posterior margin and median part of 6th and 7th terga, most of 8th tergum, and posterior margin of 10th tergum; venter pale yellow, with base of 2nd sternum, paired obscure lateral spots in basal part of each sternum, large mediobasal mark on 7th sternum, and narrow basal corner of sawsheath black.

Upper frons below ocelli weakly convex, flattened medially down to median fovea; ocellar basin represented by shallow, not well-defined depression containing paired pits in front of median ocellus and shallow furrow around median ocellus, with no lateral extension; median fovea shallow, circular in outline; frontoclypeal crest low, flattened and indistinct on clypeus and swollen between antennal sockets (frontal tubercle), keeping its height nearly up to median fovea; facial crest only weakly swollen, rounded. Head covered with irregular, generally large, shallow, often ill-defined punctures, with interspaces smooth or weakly coriaceous, shining; clypeus more strongly punctate and somewhat rugose laterally; frons distinctly rugose; ocellar area and inner dorsal part of paraantennal field with dense small punctures, somewhat rugose; narrow ventral part of paraantennal field and upper inner orbit broadly (outer 1/2 of space between dorsal part of antennal furrow and eye margin) smooth, nearly impunctate; head covered with long silvery hairs before crassa, except for nearly glabrous ventral part of paraantennal field and upper inner orbit. Right mandible bidentate, outer tooth with developed basal shoulder. Both antennae 24-segmented, with 3rd segment about 1.4 times as long as 4th. Tarsal claw with small rounded basal lobe and inner tooth distinctly shorter than outer one. Forewing with cell C almost entirely glabrous, with only a few microtrichiae. Sawsheath as in Fig. 6 D.

Measurements (in mm): Length 8.0, forewing length 8.0, head width 2.72, thorax width 2.68, scape length 0.70, pedicel length 0.25, 3rd antennal segment length 0.40,

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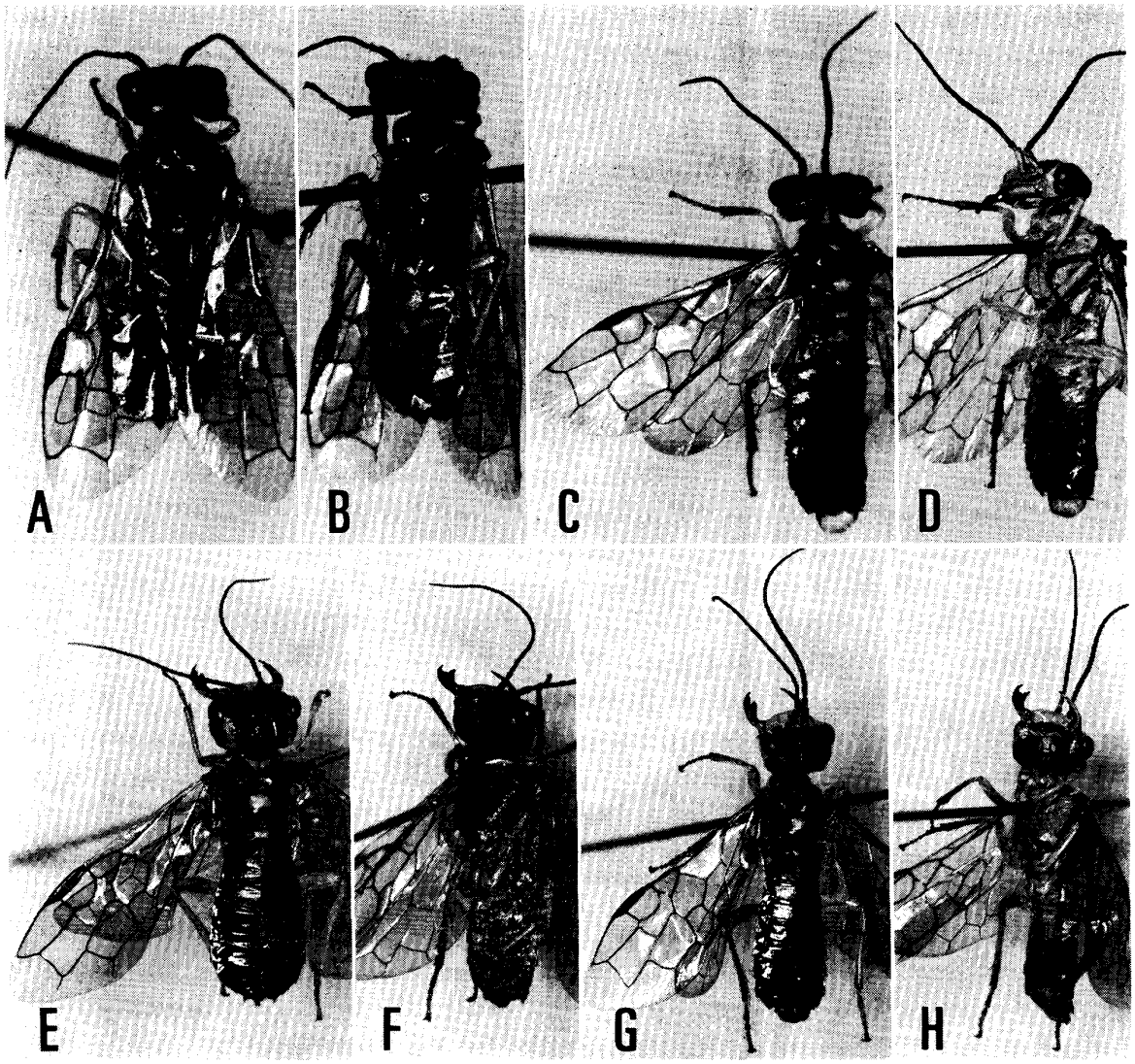

Fig. 7. A–B, *Pamphilius thorwaldi* KONTUNIEMI, ♀, Orivesi; C–D, do., ♂, Hattula; E–F, *P. lobatus* MAA, ♀, Minoto, Mts. Yatsugatake, Nagano Pref., Japan; G–H, do., ♂, Tobira-onsen, Nagano Pref., Japan.

4th antennal segment length 0.29, 5th antennal segment length 0.29, malar space 0.20, distance between proximal margins of antennal sockets 0.54, distance between antennal socket and inner orbit 0.50, vertex (length × width) 0.74×0.73, eye (shortest diameter × longest diameter) 0.69×0.88, hind tibia length 2.72, hind basitarsus length 0.63, length of 2nd–4th hind tarsal segments together 0.55, 5th tarsal segment length 0.40.

Male (holotype, Fig. 4 G–H). Head black, with marks as in Fig. 2 D, entire malar space and gena pale yellow; mandible pale yellow, with dark rufous apex; scape and pedicel pale yellow, with dorsal surface largely black; flagellum dark brown, becoming blackish toward apex, with 1st segment yellowish ventrally and black-marked dorsally. Thorax black, with following pale yellow: most of lateral pronotum extending dorsally to cover broad posterolateral corner of dorsal pronotum, ventral

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half of cervical sclerite, tegula, posterior half of prescutum, mesoscutellum, mesepisternum including preepisternum (except for very narrow posterodorsal margin), broad dorsal margin of mesepimeron (except for anterior part), metascutellum and median part of metascutum in front of metascutellum, metepisternum (except for ventral surface), dorsal (except for anterior part) and posterior halves of metepimeron; legs pale yellow, except for very narrowly black coxal bases. Wings hyaline, very slightly stained with brown; veins blackish brown, with veins C and Sc yellowish, and base of vein 1A pale yellow; stigma dark yellow, marginally blackish. Abdomen black dorsally and pale yellow ventrally; dorsum with lateral margin (more broadly on more posterior segments) and very narrow (broad on 10th segment) posterior margin of each tergum and median line of 2nd tergum pale yellow, and subtriangular spot at posterior margin of 3rd tergum and large median mark on each of 4th and 5th terga orange; venter with anterior margin of 2nd sternum black.

Frons in dorsal aspect weakly subtriangularly swollen, rather flat below ocelli, without median notch; ocellar basin inconspicuous, represented by very shallow small depression just in front of median ocellus; median fovea indistinct; frontoclypeal crest rather flat, highest and very bluntly carinate between antennal sockets; facial crest weakly convex, very bluntly carinate. Surface microsculpture and pilosity of head as in female, but dull area on paraantennal field broader, leaving only outer ventral part smooth. Both antennae 24-segmented, with 3rd segment about 1.3 times as long as 4th. Tarsal claw and pilosity of cell C in forewing as in female. Subgenital plate with apical margin broadly rounded. Genitalia as in Fig. 5 D–F.

Measurements (in mm): Length 8.0, forewing length 7.0, head width 2.50, thorax width 2.20, scape length 0.61, pedicel length 0.24, 3rd antennal segment length 0.35, 4th antennal segment length 0.28, 5th antennal segment length 0.28, malar space 0.20, distance between proximal margins of antennal sockets 0.50, distance between antennal socket and inner orbit 0.49, vertex (length × width) 0.53×0.69, eye (shortest diameter ×longest diameter) 0.64×0.81, hind tibia length 2.24, hind basitarsus length 0.53, length of 2nd–4th hind tarsal segments together 0.54, 5th tarsal segment length 0.35.

Distribution. Korea.

Holotype: ♂, Kwangneung, Gyeonggido, Korea, 15. V. 1980, A. & N. SHINOHARA (EWU). Paratypes: 2 ♀, 57 ♂, same data as for holotype; 1 ♀, "Koryo, Keiki-do [=Kwangneung, Gyeonggido], Chosen, Jun. 5, 1926, coll. K. SATO" (USNM).

Variation. The females vary in length from 8.0 to 9.0 mm, and the males from 7.5 to 8.5 mm. Five female intact antennae have 23(1 ex.), 24(3) and 25(1) segments, with the 3rd segment about 1.3 to 1.4 times as long as the 4th; 86 male intact antennae have 20(1), 22(4), 23(28), 24(51) and 25(2) segments, with the 3rd segment about 1.1 to 1.3 times as long as the 4th.

Coloration varies as follows:—Female: pale area on the head variable in extent, with the darkest and palest examples as shown in Fig. 2 E–F; in one specimen, flagellum dark brown, mesonotal lateral lobe with small pale spot along lateral margin of prescutum, and abdomen with 4th and 5th terga also pale-marked medially. Male:

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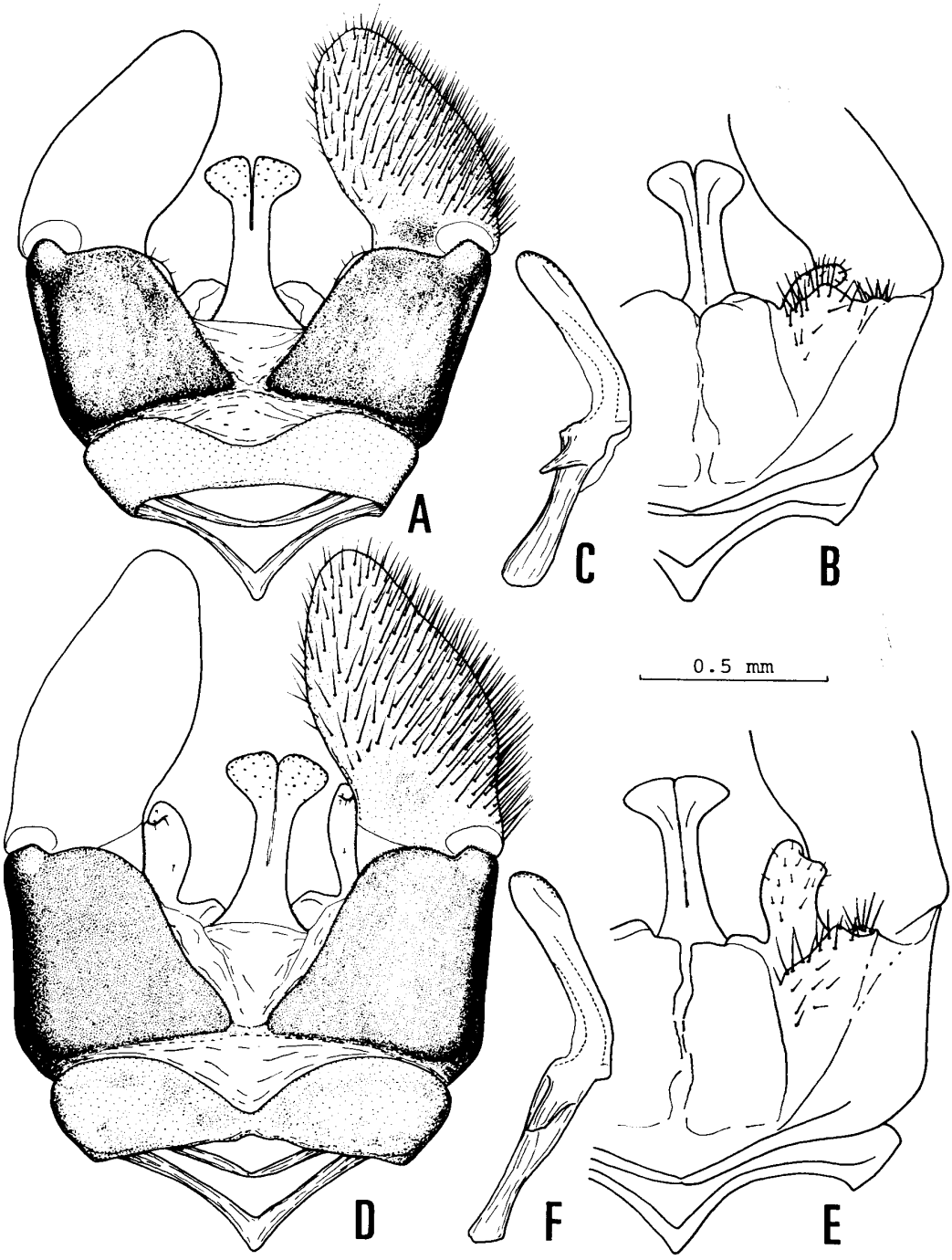

Fig. 8. Male genitalia, *Pamphilius thorwaldi* KONTUNIEMI, Hattula (A–C) and *P. lobatus* MAA, Minoto, Mts. Yatsugatake, Nagano Pref., Japan (D–F). A, D, Dorsal aspect; B, E, ventral aspect; C, F, penis valve, lateral aspect.

posterior ends of pale yellow marks on upper part of head often connected; oblong yellow spot along each lateral suture absent in a few specimens; orange area on abdomen often reduced and sometimes missing.

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Host-plant. Unknown.

Remarks. This new species is most closely allied to *P. planifrons*, to which it keys in BENEŠ (1976), as discussed under the latter species. These species will be distinguished by the points given in the key below; the female of the new species differs from that of *P. planifrons* also in having the pale area on the dorsal pronotum separated from that on the lateral pronotum by black (the two pale areas continuous in the latter species), and the pale color of the body distinctly greenish (only faintly greenish in the latter).

This new species is named in honor of Prof. Boon-Jo RHO, Ewha Womans University, Seoul.

Pamphilius thorwaldi KONTUNIEMI

(Figs. 7 A–D, 8 A–C)

Pamphilius thorwaldi KONTUNIEMI, 1946, 133; BENEŠ, 1975, 122; BENEŠ, 1976, 170; VIITASAARI, 1982, 52; ACHTERBERG & AARTSEN, 1986, 44.

Distribution. North and central Europe (Finland, Germany, Czechoslovakia) (BENEŠ, 1975).

Material examined. Finland: 1 ♀, "EH: Orivesi, 17. 6. 1947, 514, leg. J. K. KANGAS"; 2 ♂, "EH. Hattula 676: 34 Myllykylä, 29. 6. 1981, leg. V. VIKBERG."

Variation. Only one female and two males have been available for this study. The female is 10.5 mm long and the males are 9.5 and 10.0 mm, respectively, all within the range given by VIITASAARI (1982), *i.e.*, 9.5–11.0 mm. The 3rd antennal segment of the female is 1.5 times as long as the 4th (VIITASAARI, 1982, gives 1.4–1.6). The four antennae of the males are 22-segmented, with the 3rd segment about 1.3–1.4 times as long as the 4th (VIITASAARI, 1982, gives 1.2–1.4). In coloration, the two males are quite similar to each other.

Host-plant. Lonicera xylosteum.

Remarks. This species is very closely allied to *P. lobatus* MAA from Japan and Korea. The two species share a very long, apically strongly expanding valviceps, which is apparently apomorphic. The larvae of *P. thorwaldi* feed on *Lonicera*, making a leaf roll, while those of *P. lobatus* are unknown. The distributional ranges of the two species are widely separated, and, as in *P. stramineipes* and *P. pacificus*, they have probably evolved as a result of allopatric (vicariance) speciation. Characters useful to separate the two species are given in the key and discussed further under *P. lobatus*.

Pamphilius lobatus MAA

(Figs. 6 E, 7 E–H, 8 D–F)

Pamphilius lobatus MAA, 1950, 17.

Distribution. Japan (Honshu); Korea (new record).

Korean material examined. 1 ♀, Huibangsa, 750 m alt., Mt. Sobaeksan, Kyong-

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sangbukdo, 19. V. 1987, A. SHINOHARA; 1 ♀, 40 ♂, Jungsanri–Popkyesa, 800–1300 m alt., Mt. Jirisan, Kyongsangnamdo, 27–29. V. 1987, A. SHINOHARA; 6 ♂, Mirugam (Pugdaesa), 1300 m alt., Mt. Odaesan, Kangweondo, 10–11. VI. 1987, A. SHINOHARA.

Host-plant. Unknown.

Remarks. This species was described in 1950 from a female specimen collected at "Kirisumi," Honshu, Japan and no further references have been made ever since. It occurs on highlands of Honshu, and this is the first record from Korea.

Pamphilius lobatus is very closely related to *P. thorwaldi* KONTUNIEMI from northern and central Europe. The latter species is appreciably smaller, measuring 9.5–11.0 mm in both sexes (VIITASAARI, 1982) (in *lobatus*, female 10.5–14.0 mm and male 11.0–12.0 mm), and has the 6th to 8th abdominal terga more extensively orange in both sexes and lacks the yellow mark on the prescutum in the females. The shape of the frontal and facial crests is also slightly different; in *lobatus*, the frontal crest extends from the level of antennae to the level of median fovea, whereas in *thorwaldi*, it is swollen only between the antennae and rather flattened dorsally, and the facial crest is more strongly convex and more distinctly carinate in *thorwaldi* than in *lobatus*.

This species will be fully dealt with in a separate paper.

Key to the Species of *Pamphilius* Related to *P. stramineipes*

Females

1. Abdomen with at least 4th and 5th terga largely orange; venter of thorax mostly or entirely black (Figs. 1 B, F, 7 B, F).....2.
— Abdomen mostly black above, without orange marks; venter of thorax richly pale-marked (Fig. 4 B, F).....5.
2. Paraantennal field very smooth, ventral part impunctate and dorsal part with rather sparse shallow punctures; mesepisternum without yellow spot laterally in posterior part (Fig. 1 B, F).....3.
— Paraantennal field with very dense rugose punctures, with only narrow outer ventral margin nearly impunctate; mesepisternum usually with yellow spot laterally in posterior part (Fig. 7 B, F).....4.
3. Punctures on frons generally distinct, though often confluent; narrow lateral margin of abdomen above, laterotergites, and broad posterior margin of each sternum yellow; sawsheath peg small, shorter than marginal setae of sawsheath (Fig. 6 A).....*P. stramineipes.*
— Punctures on frons generally shallow and ill-defined; above-mentioned area of abdomen not or obscurely marked with yellow; sawsheath peg large, longer than marginal setae of sawsheath (Fig. 6 B).....*P. pacificus.*
4. Length 9.5–11.0 mm; prescutum without yellow marking (Fig. 7 A).....
.....*P. thorwaldi.*

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— Length 10.5–14.0 mm; prescutum with large yellow marking (Fig. 7 E)..... ..... *P. lobatus.*

5. Length 9.5–10.5 mm; head color pattern as in Fig. 2 B; malar space mostly black; broad area along upper inner orbit somewhat rugose; cell C of forewing pilose all over..... *P. planifrons.*

— Length 8.0–9.0 mm; head color pattern as in Fig. 2 E–F; malar space largely pale; broad area along upper inner orbit smooth; cell C of forewing entirely glabrous..... *P. rhoae.*

Males

1. Abdomen beyond 2nd or 3rd segment orange, marked with yellow ventrally, without black marks (Fig. 1 G–H)..... *P. pacificus.*

— Abdomen with black marks at least on 6th to 8th terga.....2.

2. Third antennal segment 1.4–1.6 times as long as the 4th; ventral part of mesepisternum, including all preepisternum ("mesobasisternum"), black, with lateral yellow marks widely separated in ventral view (Fig. 1 D); each abdominal sternum (particularly more basal segments) with black marking basally ..... *P. stramineipes.*

— Third antennal segment 1.0–1.4 times as long as the 4th; ventral part of mesepisternum, including preepisternum, entirely or predominantly yellow; each abdominal sternum, except for 2nd one, without black marks.....3.

3. Valviceps very strongly expanding laterally at apex (Fig. 8 A, D).....4.

— Valviceps weakly expanding laterally at apex (Fig. 5 A, D).....5.

4. Length 9.5–11.0 mm; frons distinctly convex only at level of antennae (frontal tubercle), rather flat above it..... *P. thorwaldi.*

— Length 11.0–12.0 mm; frons distinctly convex from level of antennae to that of median fovea..... *P. lobatus.*

5. Length 9.5 mm; upper inner orbit distinctly rugose; 3rd antennal segment 1.0–1.1 times as long as and in lateral view thinner at base than the 4th; cell C of forewing pilose all over..... *P. planifrons.*

— Length 7.5–8.5 mm; upper inner orbit smooth; 3rd antennal segment 1.1–1.3 times as long as and in lateral view about as thick as the 4th; cell C of forewing usually glabrous..... *P. rhoae.*

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